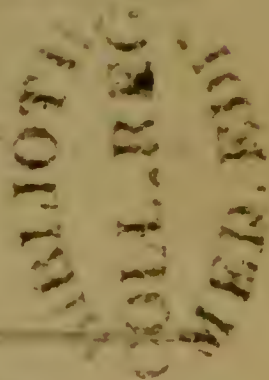
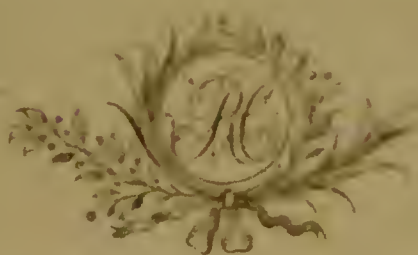


THE
HISTORY
OF
TWO CASES
OF
Ulcerated Cancer of the Mamma;

ONE OF WHICH HAS BEEN CURED,
THE OTHER MUCH RELIEVED,

BY
A NEW METHOD OF APPLYING
CARBONIC ACID AIR;
ILLUSTRATED BY A COPPER-PLATE,
WITH OBSERVATIONS.

By JOHN EWART, M. D.
ONE OF THE PHYSICIANS OF THE BATH CITY
INFIRMARY AND DISPENSARY.



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MDCXCII.

TO THE
DIRECTORS
OF THE
BATH CITY INFIRMARY AND
DISPENSARY.

GENTLEMEN,

I BEG leave to dedicate these Sheets to you, many of whom have attended, with a benevolent Curiosity, to the Progress, and have witnessed the Recovery of the first Case which they record. I desire likewise

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to

to offer any Profits which may arise
from the Sale of this Pamphlet, to
the Fund of your useful Institution,
and have the honour to be,

Gentlemen,

With great regard,

Your most obedient

faithful Servant,

J. EWART.

PREFACE.

IF the practice, presented to the notice of the Public in the following pages, were such as could endanger the life or health, or in any degree injure the persons, on whom it may be tried, I should have withheld what I now publish, until I had experience of its success in more cases. But as it is attended neither by pain or risk; as it has been successful in one case, and beneficial in another, under circumstances the most desperate and deplorable; and as it seems to promise not only a hope of recovery, but immediate relief from torture, in one of the most excruciating and untractable maladies incident to human nature, I have thought it would be wrong

to conceal what had occurred to me, wishing that others might be tempted to repeat the same experiment.

It would require much time for one individual to ascertain the efficacy of any new remedy, or rather of a new method of applying a remedy, the effects of which must be speedily established when tried by many. No time ought to be lost in determining the merits of a mode of treatment, which has been found successful in but a single instance of a very frequent,* and hitherto an incurable disease. This con-

* The frequency of Cancer, and of course the importance of communicating any probable means of relieving it, will appear in a striking light, from viewing Mr. Hill's account of the extent of his own practice in this disease, an author of undoubted judgment and veracity. Though his field for observation was by no means extensive, in the small town of Dumfries, yet in the course of thirty years he extirpated no less than *eighty-eight* genuine cancers, they being all ulcerated except four. (See Cases in Surgery.) What must be the devastation produced by this disease in London, Paris, and other populous cities!

consideration

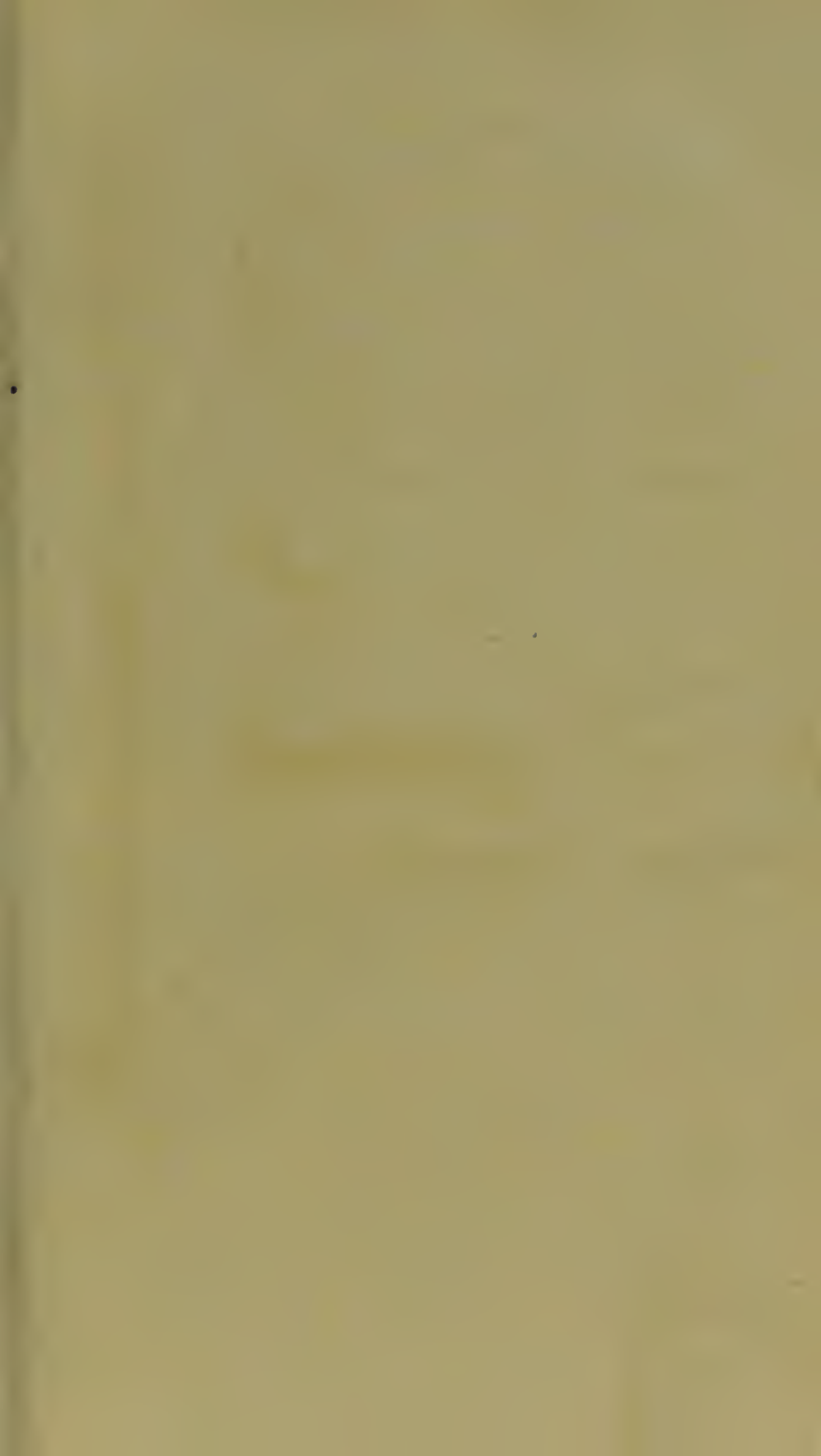
sideration will, with the candid, exculpate me from any blame in publishing the following cases, without waiting for the corroboration of others treated in the same manner, or from any imputation of wishing to raise false hopes in the minds of the miserable, by attempting to impose on the world an infallible specifick for the cure of Cancer.

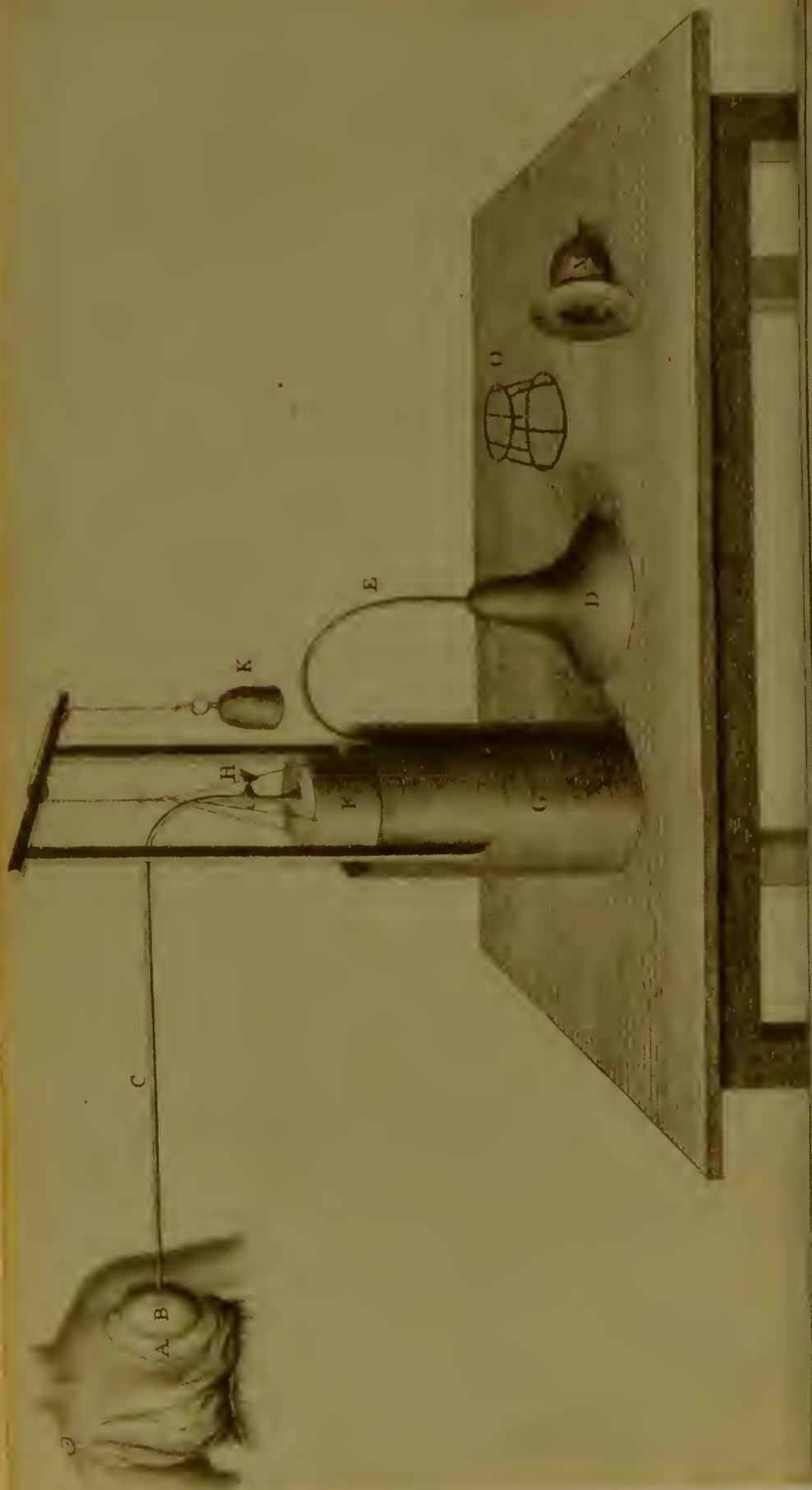
I cannot presume from the limited experience of two cases, to promise equal success in every similar one. I pledge myself for no more than I have seen.

If, however, the practice which I relate should, in the hands of others, preserve a few of those who are so unfortunate as to labour under this agonizing and destructive disease; or if, more than any other means, it should soothe its anguish where it cannot be cured, I shall be sincerely glad to have contributed to so good an end;
but,

but, on the other hand, should my hopes in these respects be frustrated, I shall be sorry for the event, but shall still think I did right in communicating as soon as possible, what I thought, by being made generally known, might be the more extensively useful.







EXPLANATION *of the* PLATE.

- A. A circular plaster, to which the bladder is attached, fixed on the breast.
- B. The bladder distended with air.
- C. A flexible tube, leading from the inverted cylinder F to the bladder.
- D. A bottle for the production of carbonic acid air from chalk and diluted sulphuric acid.
- E. A recurved tube to convey the air under the inverted cylinder.
- F. A cylinder inverted upon water.
- G. A vessel containing water and the cylinder.
- H. A cock-stop, to open and shut the tube leading from the cylinder.
- K. A balance to support the cylinder, so that it shall rise out of the water in proportion as air is received under it; the ascent of the cylinder thus measuring the quantity of air obtained.
- L. A view of the inside of the plaster to be applied to the breast, with the edges of the bladder folded back upon it.
- M. The bladder.
- N. The aperture through the plaster into the bladder, corresponding to the size of the ulcer.
- O. A small cradle made of wire to be placed over the bladder when filled with air, to prevent its being pressed upon.

ERRATA.

PAGE

16, l. 4. *for* *injection*, *read* *injection*.

17, l. 2. *for* *injection*, *read* *injection*.

17, l. 7. *for* *injection*, *read* *injection*.

HISTORY OF TWO CASES, &c.

CASE I.

SUSAN ALFORD, aged fifty-eight years, was admitted on the 24th of June 1794, an out-patient of the Bath City Infirmary and Dispensary, afflicted with an ulcer in the upper part of her left mamma. The breast was naturally of a very large size. The length of the ulcer, from the superior part of it to near the nipple, was almost five inches, and its breadth was between three and four. Its greatest depth was about two inches; and from its lower end a sinus ran under the skin downwards, the size and extent of which, as well as the quantity of discharge from the sore, may be conceived, from her being in the habit of pressing out of it
several

several times a day from a table-spoonful to two-thirds of a small tea-cupful of very fetid matter. The stench from the sore was at all times so very offensive both to herself and to by-standers, as scarcely to be endured.

The whole of the ulcerated surface reflected a shining glossy hue, without having any appearance of granulations. The ragged margins of the sore, and the substance of the mamma to the distance of an inch or two around, but chiefly below it, were swelled and indurated, forming irregular knobs, which in many places seemed to adhere to the pectoral muscle beneath. The whole was attended with almost constant pricking pain, which she sometimes compared to a sensation of burning; and this frequently increased to such an extreme degree of agony as to make her scream out for hours together. Some ounces of blood were often discharged from the sore, which happened most generally when she was warm in bed, and was followed

followed by a temporary abatement of the pain. Her appetite and strength were much impaired, her body had been progressively emaciating, and her spirits were sunk with long suffering, and the despair of finding relief. She complained of attacks of shivering, succeeded by heat and thirst, and afterwards by cold sweats, which particularly occurred in the night.

The following is the most accurate account which I have been able to learn from her, of the commencement and progress of her complaint.

About fourteen years ago she received a blow from a person's hand on the affected breast, which in consequence became painful and discoloured. The discoloration soon went off; but the breast was ever afterwards subject to frequent shooting pains, particularly when she was over-heated, her profession (that of a cook) often exposing her to be so. About two years after the above injury,

jury,

jury, she perceived, where it had been applied, a hard painful lump, and some time afterwards a purfing in of the skin over it. The uneasiness from this tumour having increased, together with its size, for some years, she applied to Mr. Atwood, surgeon, in Bath, who advised an extirpation of it; which, however, was not performed. She is not accurate as to the period when she consulted this gentleman; but from connecting circumstances, it appears to have been more than six years since. I mention this to shew the opinion entertained of the complaint so long ago, by one who will be allowed to be a competent judge.

The tumour still advancing, an excrescence gradually began to appear on the skin which covered it, resembling (according to her own expression) “*an unripe mulberry.*” To this she applied a warm fomentation of Port grounds for about two years, which she thought softened it, but gave no other relief; afterwards she bathed the affected part with warm milk and water only.

It is now more than six years that her complaint has rendered her unable to follow her profession, owing to severe pain being excited in the diseased breast on any motion being made with the arm of the same side. This may, with much probability, be ascribed to the action of the pectoral muscle; and it is a symptom not much mentioned, which I have observed in cancers of the mamma with deep adhesions. The axillary glands do not appear to have been at any time affected.

As nearly as can be gathered from her statement, which is somewhat indistinct as to dates, it is between three and four years since her breast began to discharge a mixture of matter and blood. This oozed at first from fissures in the mulberry-like excrescence, which was then of the circumference of "*a small tea-cup*," having an hardened base of that of "*a large tea-saucer*."—I use her own words here.—By degrees a scab was formed on the upper part of the above excrescence,

cence, from under which, matter similar to what has been mentioned, and not unfrequently quantities of pure blood, flowed.

Her disease progressively gaining ground, she applied about two years ago to Mr. Nooth, an eminent surgeon in Bath, and soon afterwards to the Surgeons of the Bristol Infirmary, all of whom then dissuaded her from any operation, assuring her that her complaint was a cancer of too great extent and depth to be successfully extirpated. At different periods afterwards she consulted Dr. Lysons, physician, and Mr. Norman, surgeon, of the Casualty Hospital in Bath, who confirmed the opinion of the gentlemen before-named. The testimony of so many respectable and concurring judgments, cannot fail to have weight in satisfying the publick of the nature of the complaint, and in obviating some possible suspicions of any error in my own apprehension of it.

But

But to proceed with the history of the case. The scab above-mentioned frequently falling off, exposed to view a red ulcerated surface, which gave a pain “ *as if burned by live coal;*” * but a new and thicker incrustation was soon again formed. This separation of the scab became more and more frequent, the ulceration deeper, and the discharge more abundant and more offensive. The swelling and hardness had now occupied the greatest part of the substance of the mamma, and for about two months previous to her appearance at the Dispensary, the whole tumour had been more than usually painful and protuberant. About twelve days before she came to the Dispensary, a very great discharge of blood and matter suddenly issued from the breast, carrying along with it the remains of the mulberry-like excrescence, and leaving a deep and jagged ulcer, which continued to enlarge

* Her own expression.

more rapidly, with increase of the discharge and of the pain.

I have been more minute than was perhaps necessary in the foregoing detail; but the unexpected result of the case has made me solicitous to leave no circumstance unmentioned, which could enable others to judge for themselves, whether it was what should be considered as a genuine Cancer or not: and that I might avoid as much as possible any misstatement of the facts, I have carefully collected and noted them, in the presence and under the correction of several Physicians and Surgeons of Bath, who have repeatedly examined the patient along with me, and who have been witnesses of the success of the treatment to be described.

When I first saw the patient, I confess I entertained no greater hopes of affording her any essential benefit, than the gentlemen had done whom she consulted before me. I had, however, heard of several, and had seen some imperfect

imperfect attempts to apply *Carbonic Acid Air* to cancers and other foul ulcers; and although the success of such experiments had been so inconsiderable as to have generally discouraged any farther trial of them, yet some relief which they seemed to give, promised, in my mind, more advantage from a better application of the remedy.

Considering the foregoing case as a proper subject for a safe experiment, I gave directions to Mr. White, apothecary to the Bath City Infirmary and Dispensary, for the following process, which was put in execution on the day of the patient's admission.

The neck of a bladder was cut off, so as to make a circular aperture into it of such dimensions as to correspond nearly with the size of the ulcer of the breast. A round hole of the same size was cut in a piece of soft leather, spread with adhesive plaster, and large enough to surround the ulcer. The cut end of the bladder was introduced through the
hole

hole in the leather, and its edges folded back and stuck to the plaster on the opposite side; forming somewhat of the shape of a round hat, the plaster resembling the rim, and the bladder, when distended, the crown. In order the more effectually to cement the adhesion of the bladder to the plaster, and to make it airtight, narrow circular strips of plaster were applied round their junction both inside and without. The large plaster was then fixed on the mamma, the aperture in its center with the bladder fitted to it being placed exactly over the ulcer, no part of which was touched by the plaster. A small orifice was made at the *fundus* of the bladder, sufficient to admit a tube of about a quarter of an inch diameter, which communicated with the top of an inverted cylinder, suspended upon water, which cylinder was filled with carbonic acid air. [See the plate.] The bladder being closely squeezed, to expel from it the atmospheric air it contained, and the above-mentioned tube being

being inserted into the orifice formed to receive it, and tied by a ligature passed over the bladder, the inverted cylinder was pressed down in the water, so that the carbonic acid air was made to rush through the tube, and distend the bladder. The tube being then withdrawn, the orifice at the fundus of the bladder was tied, to prevent the escape of the carbonic acid air, which was thereby kept in contact with the ulcer. As often as the bladder collapsed, so as to shew that much of this air had got out, it was filled in the same manner as before; and this operation was repeated sometimes twice, sometimes three times a day, according as it appeared necessary. It is a proof of this simple apparatus fully answering its purpose, that the bladder, when filled at night, was for the most part found to contain a considerable quantity of its air the following morning.

When the carbonic acid air was thus applied to the sore, it first occasioned a

C
sensation

sensation of coldness, which lasted for a few minutes, and was afterwards succeeded by a glowing warmth, which continued more than half an hour. The same sensations have been uniformly expressed by the patient, after each successive application of the air.

The next morning she said she was easier, which was then ascribed to the usual propensity of people to be pleased with a new remedy. But greater confidence was given to her report, when, at the expiration of not more than three days, the surface of the sore appeared of a better colour, and the stench from it became less offensive. Each time the bladder was removed, which for some time was done twice a day, to evacuate the discharge from the sore, she was sensible of immediate pain on the admission of the atmospheric air; and never failed to find ease very soon after the carbonic acid air was again applied.

When

When I gave directions for the above application, I prescribed likewise a cautious use of arsenic *internally*. The preparation of it ordered was not ready for some days; and Mr. White, who applied the air, on whose accuracy I can rely with much confidence, is positive that not only the smell from the sore was less fetid, but that its surface shewed a disposition to granulate, before any arsenic was given. It is likewise certain that the patient's expressions of relief were not cold or ambiguous, but approaching to rapture. Had I seen her at this period, I should certainly have given up my intention of trying the arsenic, in order to ascertain more unequivocally the effects of the air by itself; but as I happened to be gone to a distance for a short time, Mr. White was attentive to execute the whole of my original prescription. The patient began at this time to take a sixteenth part of a grain of white arsenic, dis-

solved according to Dr. Fowler's formula, three times a day.

The ulcer continued to wear a better appearance daily. The pain was not greater than that of a common wound of the same size; the discharge gradually lessened in quantity, and assumed the colour and consistence of mild pus; the circumference of the sore contracting, and its cavity filling up, its general dimensions were on the 21st of July (when I returned to my duty at the Infirmary) not quite a third part so great as they were when I saw it on the 24th of the preceding month: and the sinus at its lower part was then so much diminished as not to be capable of containing more than a tea-spoonful of matter. The indurations in the mamma had become much softened, and were evidently dispersing. The patient had recovered her appetite, her strength, and her sleep, and was in every respect a renovated being.

At this period I admitted her an in-patient, that the farther progress of the case might be more constantly observed, and every phenomenon faithfully described for the satisfaction of the publick. No change was made in the treatment, as I thought it would be an ill-timed experiment to run a risk of interrupting so successful a recovery, by omitting either the arsenic, or the application of the air, for the purpose of ascertaining to which of them we ought chiefly to impute it.

After her admission into the house the sore continued to heal up, without interruption, without pain, or any other occurrence worth mentioning, until the 22d of August, on which day the discharge from it appeared somewhat bloody, and the disposition of the remaining sore (which was now very small) more irritable. She said she had hurt her breast the night before, by turning on her face while asleep in bed.

Some days afterwards she was troubled with diarrhæa, attended by a frequent pulse, a hot skin, and inflamed tonsils. On the 31st an erysepelalous inflammation shewed itself over the skin of the affected mamma, but without materially affecting the appearance of the fore. These symptoms seemed to be wholly unconnected with the original complaint; but continued more or less till the 13th of September. The arsenic was now left off, but the carbonic air was never removed; and by the 19th the sinus was entirely filled up, and the ulcer closed.

No deep induration whatever is felt in the seat of the former fore, or in that part of the substance of the breast which was occupied by the sinus; the whole of which bears handling and pressure without suffering the smallest uneasiness; but the skin formed by the cicatrix is somewhat irregularly elevated and hardened. Some slight vesications have at times arisen upon it, extending no deeper than

than the epidermis, and apparently some remains of the erysepelas which lately affected her. They have now nearly vanished.

The ulcer would in all probability have been healed sooner than it has been, if the sinus had been laid open to its bottom; but I was unwilling to allow it to be touched by a knife, lest more might have been attributed to it than its due; and the experiment was not necessary in the progressive state of amendment of the sore.

She was discharged on the 30th of September, with orders to return twice a day for some time to have fresh gas applied, as the best defence of the newly-formed skin from any external injury.

CASE II.

MRS. A. lady of Mr. A. banker in Bath, aged fifty-seven years, consulted me on the 27th of July 1794, in consequence of having seen the patient whose case has been described, after the latter had been more than a month free from pain, under the above treatment, and when her ulcer was much contracted.

MRS. A. had at this time an open ulcer in the left breast, the appearance of which was altogether hideous. It was somewhat of an elliptical figure, extending from the sternum nearly to the axilla lengthways, and laterally from at least two inches below where the nipple should be towards the clavicle. Its length, by accurate measurement, was full six inches, its breadth more than four and a half, and its size constantly increasing. Its utmost depth
was

was about two inches; its edges uneven, hard, and dentated; its surface was very irregular, and from nearly its center arose a prominent and very hard ulcerated tumour, immoveably fixed at its base, from which blood flowed on the least pressure being applied to it, frequently on the mere admission of the atmosphere, and sometimes spontaneously. A few days before I saw her, not less than a pint of blood had been discharged from the sore at one evacuation. The matter from it was in large quantity, thin, ichorous, and highly offensive to the smell. The glands of the axilla were not then perceptibly affected, but had at different times during her disease been swelled, and again subsided.

The pain of the ulcer was extreme, and almost unceasing. She described it by the terms *pricking* and *stinging*. She had not enjoyed one night of quiet repose, on account of it, for twelve months. Her body was emaciated almost to a skeleton, her appetite

was gone, her pulse was at a standard of not less than 100 strokes in the minute, and amounting frequently to 20 more, particularly in the evenings and in the night, when she was subject to chilly fits, succeeded by heat and sweating.

The following is the history of her case, the particulars of which have been given to me in writing by her husband.

In May 1791, she discovered a hard knob in her left breast, about the size of a marble. Finding it increase, she had a consultation of a physician and two surgeons about three months afterwards, all of whom advised her to have it cut out. The knob was then as large as a pigeon's egg. Dreading an operation by the knife, she applied to a country quack, who in August 1791 put a caustic to it, which kept open for three months. It was then healed, but a hardness was still left in the breast. This having considerably augmented, the same person applied another caustic

caustic to it in March 1792. He continued to dress, in his own way, the wound he had thus made, till June 1793, but it was at this time so far from being disposed to heal, that it grew constantly larger, and of a fouler appearance, much reducing the health and strength of the patient.

At this period she was recommended to apply to the sore some nostrum which she received from Ireland, and to take internally drops of the *terra ponderosa salita*. During the use of these, the ulcer appeared cleaner, and discharged matter of a thicker consistence. Her general health too was improved. Being some time afterwards deprived of a supply of the Irish application for near two months, the ulcer grew more painful, foul, and offensive; and was again for a time cleansed in some degree by a repetition of the same application. But though this, and drops of the *terra ponderosa salita*, were continued till within two months of the period when I
first

first saw the patient, the ulcer had gradually increased, and her health had sunk to the degree above-mentioned. The pain during the whole time was seldom absent, and often excessive. She left off this application and the drops, from finding them ineffectual, and afterwards dressed the breast with some simple ointment.

On the 28th of July 1794, carbonic air was applied to the ulcer, in the same way as in Alford's case. She was sensible of almost an immediate abatement of pain. On the 30th she declared her breast quite easy, and that she had enjoyed a better night than for some months. On the 31st she could move the arm of the affected side with more ease than formerly.

August 3d. The ulcer tolerably free of bad smell, and its discharge more puriform, but very abundant. Her debility and want of appetite being alarming, she began to take an ounce and a half of a pretty strong decoction

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tion of the broad-leaved willow bark* three or four times a day, which I have found in hospital practice little if at all inferior to Peruvian bark, as a tonic medicine, and grateful to many stomachs which rejected the latter. A general restorative regimen was likewise enjoined.

10th. Her appetite, having been improving, was this day better (she said) than for any time these two years. The fore easy, discharging less matter, of a better consistence, and no blood since the first application of the carbonic air. Few or no symptoms of pyrexia for some days.

12th. Yesterday fatigued herself by sitting the first time for many months in the garden. Became chilly, and was assisted into the house. Afterwards slept all night with one of the

* I was first led to use this remedy, in consequence of the favourable report of its virtues lately published by Mr. James, of Hoddeston; and I have not been disappointed of success in a good many trials of it.

windows of her chamber by accident left open. This morning was attacked by violent shivering fits, recurring at intervals, and succeeded by sickness, great restlessness, thirst, heat, and a quick pulse. Saline draughts, with small doses of antimonial wine, were given her, occasionally gentle opiates, and afterwards the decoction of the willow bark, which on the first recurrence of the fever was omitted. On the 17th this was exchanged for the decoction of the Peruvian bark. The feverish symptoms, which were at first imputed to the patient having caught cold, in a very few days from their commencement assumed an evident and strongly marked hectic type, with a pulse in the exacerbations of the fever rising to 130, together with most profuse perspirations, and such a degree of prostration of strength, that the patient could scarcely bear to be gently moved in bed from one side to the other. Yet on the 21st, although these symptoms had not quite subsided, the
fore

fore on the breast measured an inch and a half less in circumference than when the carbonic air began to be applied to it; no pain had been felt in it even during so severe a general indisposition, its surface looked more healthy, and it discharged a white thick matter.

27th. She began to take, instead of the decoction of bark, Dr. Griffiths's well-known mixture, composed of salt of steel, myrrh, and vegetable alkali, in doses of four grains of the first article twice a day.

Sept. 2^d. The ulcer has for some days discharged very little matter, which is of a thinner consistence. Her appetite is better, her pulse reduced to a standard of between 80 and 90, and her strength returning.

6th. Complains to-day of being chilly, but has no symptoms of fever in the pulse. The ulcer growing drier.

13th. The whole surface of the ulcer having become so dry as to approach almost

to a scab, she complains of an uneasy sensation of stiffness in it, particularly on drawing a full inspiration, but has none of the former shooting or pricking pain. She gains strength rapidly.

16th. A small discharge of thick white matter from the breast, which has removed the uneasy stiffness of the sore, and softened its surface.

27th. Has continued perfectly easy. Is stronger, and walks more erect than for two years past. Appetite perfectly good, and sleep undisturbed. Although the depth of the ulcer has filled up considerably, and its diameter has been contracting, yet in neither of these respects has it mended near so rapidly as Alford's sore did. Its dimensions are now one inch less in length, and half an inch less in breadth, than when she began to apply the gas.

The carbonic air is kept constantly applied, the bladder being removed only once a day, when,

when, as in Alford's case, the patient is immediately sensible of the irritation of the atmosphere. She continues to take Dr. Griffiths's mixture.

How far her recovery may proceed, I do not presume to conjecture. But it is no small recommendation of what has been applied, that it has kept a person in ease and comfort for two months, who for so great a length of time before had known only agony and torture; and who in the same interval has to a most surprising degree recovered her general health.*

* Since the above was written, Mrs. A. had for two days (the 31 and 4th of October) some return of pain in her liver, which of late has discharged a more ichorous matter, and has shown less disposition to heal than formerly. Suspecting that the discharge, by insinuating itself between the plaster and the skin, had opened an outlet for the carbonic air, and an entrance for the atmosphere, I directed the application of the carbonic air to be more frequently renewed. The pain has since subsided, and the discharge from the sore has been diminished.—Oct. 9th.

OBSERVATIONS, &c.

IT is sometimes not a little difficult to distinguish carcinomatous ulcers from others of a more benign nature, but of suspicious aspect. When the former disease is in its incipient state of scirrhus, many tumours of a very different character have been mistaken for it, and extirpated improperly. But the cases which have been described, are so strongly marked by every feature of the most formidable state of malignant cancer, that I am persuaded no two experienced physicians or surgeons could any where be found, who on seeing them would have differed in opinion about them. The conviction, however, which would have followed examination, may not be so certainly produced by description. It will not, therefore, be amiss to bring together

ther and compare the leading circumstances of both cases, to shew their correspondence with one another, and with the received characters of confirmed cancer in every material point.

In both cases we find the *tumor scbirrodeus, ægre suppurans, in ulcus depascens mali moris abiens*. In both were felt severe *lancinating* pains, with a violence and for a continuance unknown in other ulcers. In both the disease was *progressive*, a symptom not peculiar to cancerous ulcers, (as it likewise takes place in syphilis) but distinguishing them from serophulous, scorbutic, and other sores, which are often stationary or retrogressive. In Mrs. A.'s case, indeed, the ulcer for a time, during the use of the Irish application, and of the *terra ponderosa salita*, was somewhat cleaned on its surface, yet the pain did not abate, and the decline of the constitution shewed the continued progress of the disease.

In both cases there was an highly offensive, ichorous, bloody discharge; both ulcers had the *labia dura, eversa, schirrosa*; and both patients were hectic.

The difference of the two cases consisted in the schirrous tumour in Alford's case succeeding to a blow, and that of Mrs. A's supervening spontaneously; and in Alford's tumour proceeding slowly to suppuration, while the other was first converted into an ulcer by the application of a caustic. A few observations are suggested by these circumstances.

1st. As the tumour in Alford's case was not perceived for two years after the blow, although she suffered pains of the breast in the interval, it is by no means certain that the blow was the occasion of the tumour.

2^{dly}. Supposing the blow to have been instrumental in producing the tumour, it does not follow that this tumour was not originally of a schirrous nature, leading to cancer,

or

or was otherwise differing from Mrs. A's case, except in the accidental circumstance of its remote cause. If a disease, by whatever external cause first excited, shall assume the same appearances and pursue the same course as another which arises spontaneously, must we not give it the same name, and consider it of the same nature and tendency? We are unacquainted with the laws of operation either of the visible or occult occasions of the malady. Has not every practitioner known instances of the most untractable cancers being traced, or at least ascribed, to external injuries?

I should not have thought these observations necessary, in what I believe to be the present state of opinion on the subject, if a gentleman whose judgment I respect, but who never saw the cases in question, had not lately observed to me, when speaking of them, that he considers ulcers apparently cancerous, arising from external causes, as essentially

essentially different from spontaneous cancers, which he supposes to be owing to a constitutional taint. The success attending excision in both cases, if sufficiently soon performed, as the experience of a Bell, of a Hill, and of many other great names, has evinced, proves to a demonstration that cancer in all cases is primarily a local disease.

3dly. One circumstance in Mrs. A's case deserves particular notice. Not only the ulcer was first made by a caustic, but the wound made by the first caustic was afterwards healed. A confirmed schirrus, however, preceded this application, which, it cannot I think be doubted, would have sooner or later ulcerated of its own accord. From every enquiry I have made of the patient, I am satisfied that the caustic which was first applied had not penetrated so deep as to corrode any part of the schirrous tumour; of course the superficial sore produced by it closed as soon as the escharotic dressings were removed.

But

But the second application of the caustic seems to have been more powerful, and to have reached the substance of the schirrus, which, being once brought into a state of ulcer, continued to suppurate and extend, with every mark of the most inveterate cancer.

4thly. The drying up of the discharge in Mrs. A's case, during one period of the application of the carbonic air, is singular, and different from what happened to Alford, whose ulcer continued to pour out a consistent pus, though in moderate quantity, till it closed. I cannot state with confidence what this difference was owing to; but it was likewise remarked in Alford's case, that when the gas was most frequently renewed, the discharge was the most diminished. Perhaps in the period alluded to, Mrs. A's bladder may have been more accurately filled than usual.

5thly. No symptoms occurred during Alford's use of the arsenic, to shew that it had any perceptible effects in contributing to her cure. I have been informed, however, that in America it has been lately tried with advantage in cancers; but this is not confirmed by the experience of Mr. Pearson, and of other persons in our own country.

It would doubtless be a matter of much importance, as well as of laudable curiosity, to investigate and ascertain the mode of operation of carbonic air on the foregoing cases, as a successful result of the enquiry might lead to new applications and modifications of the remedy. It is long since it has been proposed for the cure of cancers and other ulcers. Dr. Percival, in his Essays, mentions some trials he had made with it on the former of these diseases, which were attended at least by temporary relief. Dr. Dobson, in his book on fixed air, speaks of his having failed of
success

success in applying it to cancerous ulcers; but gives cases, on the authority of the gentleman last named, of Dr. Haygarth, Mr. White, and himself, in which gangrenous and phagedenic sores, and particularly the ulcerated fore-throat, were much benefited by *fumigating* them with this acid gas. My friend Sir George Colebrooke informs me, that twenty years ago a surgeon of the Middlesex Hospital, whose name he does not recollect, shewed him a patient who had been cured of a supposed cancer of the lip, by exposing it to a stream of carbonic air; and that a relation of his own, who had a cancerous ulcer on the nose, kept it from advancing by the same means.

It is probable that M. de Fourcroy alludes, in the first part of the following quotation, to some of these instances; and no doubt can be entertained of the truth of the facts afterwards mentioned by him. He observes, [see Fourcroy's *Elemens de Chimie*, tom. i. p. 449]

“ Les

“ Les papiers publics ont annoncé l’his-
 “ toire de plusieurs cures de cancer, faites
 “ en Angleterre, par l’application de l’acide
 “ carbonique. Nous pouvons assurer avoir
 “ vu employer ce moyen plusieurs fois, &
 “ l’avoir employé nous-même sans succès.
 “ Dans les premières applications, l’ulcère
 “ cancéreux semble prendre un meilleur ca-
 “ ractère ; la sanie qui en découle ordinaire-
 “ ment, devient blanche, consistante, & puri-
 “ forme ; les chairs prennent une couleur
 “ vive et animée ; mais ces apparences flat-
 “ teuses de mieux ne se soutiennent pas ;
 “ l’ulcère revient bientôt à l’état où il étoit
 “ auparavant, & parcourt ensuite ses péri-
 “ odes avec la même activité.”

To account for the difference of the result
 of M. de Fourcroy’s experiments, and of
 the other unsuccessful trials which have been
 made with carbonic air upon cancers, from
 that of the first case I have related, it is to be
 remarked, that this remedy has heretofore
 been

been applied to sores, either by holding them over the steam of fermenting mixtures in open vessels; or by pointing a tube to them, leading from a vessel in which carbonic air was generated; or by means of fermenting poultices. It is likewise probable that the carrot poultice, and the poultices of fresh animal dungs, which have been in use, act in consequence of carbonic acid being extracted from them. In the latter way its application must be uncertain, on account of the intervention of the substance of the poultice itself, and of the variable supply of the air from it; and in either of the two former ways, the carbonic air, by its specific gravity, will fall from the part on which it is poured, or be speedily wafted away by every breeze of the surrounding atmosphere. It is no inconsiderable proof, therefore, of the efficacy of this gas on ulcerated surfaces, that such momentary and imperfect methods of applying it should produce even a temporary benefit.

May not much more be reasonably expected from its continued and accurate application?

What strikes us, in the two preceding cases, with the greatest astonishment, is the almost instantaneous relief of pain, which never failed to follow the application of the gas; and the return of it to a certain degree on its removal. Does this sudden relief imply the exclusion of a hurtful cause, or the operation of an active agent? Did the carbonic air, therefore, act merely by excluding the atmosphere, or more properly the oxygen of the atmosphere, which is known to be highly stimulant to the living solid, and has been supposed, by some modern theorists, to be the principle of irritability, and of life itself? If so, the success of the practice must have been owing to the *mode* of applying the gas, by which every particle of oxygen in a disengaged state, or in a state capable of combining with or acting upon the ulcer, *quâ* oxygen, was accurately removed. For it is very improbable

bable that the carbonic acid could be decomposed by being kept in contact with the ulcer or with the matter which it discharged. Of all the compounds of chemistry, it is perhaps that which is the most difficultly decomposed, owing to the charcoal and oxygen of which it is constituted having a stronger attraction to one another, than either of these substances have for any other known body. Its decomposition has not been yet accomplished but by means of double affinities; and we cannot reasonably imagine any unknown matter in the discharge from a cancer capable of effecting a disunion of principles, which no other single chemical agent has produced.

Supposing the carbonic air, therefore, to have operated in the way above suggested, we should be led to expect the same effects from nitrogene or inflammable airs applied in a similar manner. Do the simple dressings of surgeons act otherwise than by excluding the atmosphere? It is well known that all ulcers
are

are injured by being exposed to the common air; and that abscesses, until opened, do not in general cause hectic fever. From the latter fact it has been suggested to me, in a letter from Mr. Watt of Birmingham, (the celebrated improver of the steam-engine, and one of the most accurate experimentalists of the age, who I am happy to find has of late applied the vigour of his mind to discoveries in pneumatic chemistry) that, as in Dr. Beddoes's case,* a continued inspiration of oxygen air produced hectic symptoms, so the absorption of oxygen by the humours of an ulcer, and of these by the system, may be the cause of the hectic fever which attends suppuration. On this account it may be of the last importance to exclude the atmosphere as much as possible from all sores. Mr. Abernethy's late experiments appear to prove, what may give some support to this idea,

* See his letter to Dr. Darwin.

that oxygene air is absorbed by the surface of our bodies. After exposing his hand for five hours to some atmospheric air, contained in a jar inverted on quicksilver, and throwing up lime-water to absorb the carbonic air which had perspired from his hand; he found that the remaining air, on being tried by the test of nitrous air, had lost nearly one-sixth of the oxygen it contained before the experiment. To this I am aware it may be objected that the disappearance of oxygen was here owing to its becoming saturated with carbone derived from the skin, and forming the carbonic air afterwards fixed by the lime-water. His previous experiments, however, demonstrate that carbonic air already formed is perspired by the skin; and others of them seem to shew that the absorbents take up oxygene in preference to other airs.*

* See Surgical and Physiological Essays.

Had the carbonic air in the foregoing cases any positive or active operation?

It does not appear to possess an escharotic power, for in neither of the preceding cases did it give pain, or produce an eschar. It does not seem to meliorate the nature of the discharge by attracting any principle from it, which alters the chemical properties of the acid itself: I have collected some of the acid air which had been in contact with Alford's fore for several hours, and found that it extinguished flame, precipitated lime-water, and reddened the infusion of turnsole.

Has the carbonic air any direct sedative effect upon ulcers, by destroying their sensibility?

Bergmann thought that it suffocates, by immediately destroying irritability; but the improved doctrine of respiration accounts for its producing suffocation in a more satisfactory manner. The Chevalier Landriani affirms that it extinguishes irritability, even
when

when applied to the skin. By tying a bladder full of this gas to the neck of a fowl, in such a manner that only the head of the animal was in the open air, and the whole body inclosed in the bladder, the fowl (he asserts) immediately perished. The Abbé Fontana, however, denies the truth of this experiment; but he does not seem to have used pure carbonic air.

Or, was the carbonic air absorbed by the ulcers, in the preceding cases, or combined in its state of a compound acid with the matter of the fores?

I have not been able to determine whether any part, or what quantity, of this air was absorbed by the ulcers. It is true that some of it disappeared during its application, as the bladder in which it was contained collapsed the more the longer it was fixed on the breast. I am inclined, however, to believe, that part of it escaped, because it was impossible to make the bladder and plaster

perfectly air-tight; and because the bladder shrunk, both when the ulcer in Alford's case was diminished in size, and when it was largest. At the same time, Mr. Abernethy, in the Essays already quoted, proves in a very clear manner, not only that carbonic gas is thrown forth from the skin, but that it is likewise capable of being absorbed by it in very considerable quantity. By exposing his hand for nine hours to six ounces of carbonic gas, the quantity of the latter was reduced to less than three ounces.* How far a similar absorption may have contributed to the relief of the ulcers which I have described, must be decided by the result of future experiments.

With respect to the possible combination of the carbonic acid with the matter of can-

* If carbonic air be absorbed by the surface of the body so largely, and if Dr. Beddoes's speculations on phthisis be found to have validity, may we not carbonize the system by ærial baths, instead of the inspiration of airs of a low standard, and thereby reduce the excess of oxygen in the blood and solids, if such really takes place in that disease?

cerous ulcers, I have very little to add. The discharge from cancers has been supposed to be corrosive. I do not know that this is a fact. If it be true, and if the acrimony of the discharge be of an alkaline nature, the carbonic acid may neutralize it, and deprive it of its causticity. This supposition was suggested to me by my friend Dr. Master, when it was too late to examine it by experiments on the matter of the ulcers above described, owing to the diminished quantity of their discharge. Very obvious tests, however, will occur to every one, who may have opportunities and inclination to investigate the subject.

If the carbonic air acted, in the cases under review, by combining with and chemically changing the discharge from the ulcers, other airs may perhaps be applied to similar sores with even more advantage. If their pain be caused by the stimulus of oxygen, hydrogenic air is capable of immediately combining with

it; and the accurate Mr. Watt assures me that this air has a powerful effect in allaying the pain of external inflammation and sores. Whether the union of the oxygene and hydrogene airs may not, however, render the discharge from cancers more thin and watery, a circumstance not to be wished, must be determined by trials. But this is only a surmise, as I know no facts to be depended upon, that prove this combination to produce water without a more rapid combustion than can be expected in the degree of heat of the surface of ulcers.

Mr. Watt obligingly informs me,* that in his experiments he has found the inflammable airs from charcoal, iron, and zinc, speci-

* For a full account of Mr. Watt's ingenious experiments and discoveries upon different kinds of airs, and for a description of the apparatus which he has invented for procuring them, I beg leave to refer to an interesting publication of Dr. Beddoes's, now in the press, which will be given to the world about the same time as this pamphlet.

fically different, agreeing in nothing but their inflammability; that they all contain a quantity of the solid by means of which they are produced; and he suggests, that as the inflammable air produced by charcoal and water, contains a quantity of the former in an aëriform state, we may in its application to ulcers, expect its antiseptic virtues as well as from carbonic acid air. He thinks it more likely to carbonize the blood, or the humors of the sores, as it may be absorbed by oxygen; whereas the carbonic acid air is already saturated with this principle.

He farther alludes to the use of zinc applied in substance to ulcers; and suggests the possibility of its being conveyed to them with advantage, either on the surface of the body or in the lungs, by means of the inflammable air produced from zinc by heat and water. What seems to obviate the objection started above to the application of the hydrogen gas to cancers, as capable of diluting their discharge,

charge, is an observation of this gentleman, that a few inspirations of this air from zinc very sensibly thickened the mucus of the lungs.

I beg once for all to observe that the foregoing speculations have arisen out of the cases before described; and that no preconceived theory has had any share in biasing my judgment of the practice which I have related. I have no partiality for any of the suppositions which I have stated, and place no value upon them, but in so far as they may lead others and myself to obtain a knowledge of more facts by experiment.

Experiments, with the different factitious airs mentioned, may with perfect safety be made not only on cancerous, but on many other ulcers, which it is unnecessary to particularize. Where surgeons use merely simple dressings, which they seem to simplify more and more every day, it appears impossible that they can act otherwise than by excluding the
atmosphere,

atmosphere. As every substance applied to a raw sore must irritate more or less, the irritation of the dressings commonly employed, may be avoided by applying airs of a low standard. Hence an obvious indication of their use in incised wounds, and after surgical operations, such as the amputation of the mamma, of the extremities, &c.

Another subject for their trial is in all cases where surgeons open cavities. In the lumbar abscess, for instance, it is well known that the cyst is tolerably free of inflammation in general, until opened either by ulceration or the hand of a surgeon, when a sudden and great inflammation takes place; and the success of the cure is commonly in proportion to the care with which the atmosphere is excluded. The same thing happens in evacuating collections of matter from the Bursa Mucosæ, or from the capsular ligaments of the joints; in the operations of the trepan, for the hernia, empyema, suppurations in the liver, and in
the

the Cæfarean operation itself. In most or all of these cases, airs of a low standard may be applied with convenience and ease. Their employment is the more clearly indicated here, because when the common air is once admitted into cavities, the usual dressings confine what has already entered, without absorbing or expelling it. The application of a quantity of carbonic, nitrogene, or hydrogenic airs, however, would either simply mix with and dilute the atmosphere so admitted, or chemically combine with its oxygen, and render it in either case innoxious. On an opposite principle they should not be applied after the operation for the hydrocele, where the object is to excite inflammation by the admission of the common air. Would the injection of oxygene air into the scrotum be of use in this case?

Would the application of the former airs be beneficial to inflamed as well as ulcerated surfaces, such as erysipelas or ophthalmia?

They

They appear deserving of a trial in burns; and it would be no very difficult matter to envelope the whole body in any of them when scalded, the mouth and nostrils excepted. If the Chevalier Landriani's experiment, formerly mentioned, be well founded, I would prefer nitrogene or hydrogene airs, in this case, to the carbonic.

If factitious airs are to be applied to large surfaces or in large quantity, where a bladder would be too small to confine them, pieces of silk, varnished with amber or cobalt varnish, fitted to the size and shape of the part, and their edges accurately fixed to the skin by adhesive plaster, ought to be employed. Varnished silk, it is well known, is used in balloons for confining inflammable air, the most fugitive of all the permanently elastic vapours; and it will therefore more easily retain carbonic air, which is a much less subtile fluid. For the application of airs to the extremities, bags may be made of this silk,

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resembling

resembling wide stockings, which will require being fixed by plasters, or tied by strings, only where they are open at top. Other modes of shaping and applying pouches of silk to whatever parts we chuse, will occur to every person of the most moderate capacity for invention.

It is enough to mention a few, in order to suggest many familiar cases, in which the external use of airs may be tried. I abstain, therefore, from multiplying examples.

I trust, however, that I do not altogether flatter myself with a vain hope, when, in addition to what Bacon said of the discoveries in his time, “ that a new philosophy has
 “ issued from the furnaces of the chemists,
 “ which has confounded the reasonings of the
 “ ancients,” I subjoin, that a new Medicine likewise, with healing on its wings, may be expected to arise out of the old, from the application of the late discoveries in chemistry to practice.